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EXAMINER	
SONG, MATTHEW J	

ART UNIT	PAPER NUMBER
1765	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/904,129	UEDA, TETSUZO	
	Examiner	Art Unit	
	Matthew J Song	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16,17,19-35,37-43,48,51 and 52* is/are pending in the application.

4a) Of the above claim(s) *21,22 and 26-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16,17,19,20,23-25,31-35,37-43,48,51 and 52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 16 recites, "growing an III-V nitride alloy film on the spin coated film after said annealing, which is thicker than the spin coated layer and provided that any group III element in the grown III-V nitride alloy film is different from the one or more group III elements of the spin coated film" in lines 10-13. The bulk of the instant specification teaches in the first, second, third, fourth, and fifth preferred embodiments on pages 6-12, growing a GaN buffer by spin coating and growing GaN layer on the spin coated layer, which is in direct contradiction of the instant claim. At best, the specification teaches forming a spin coated AlN buffer and a GaN layer thereon, note page 5 and 6, which does not provide support for "spreading a liquid comprising **one or more** group III elements" and also does provide support for the broadly claimed limitation of the group III elements are different. The instant specification only provides support for a spin coated AlN buffer and a GaN layer, thereon.

3. Claim 34 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 34 recites, "spreading a liquid comprising a compound having a metal and oxygen on a substrate" in lines 3-4. The instant specification merely provides support for zinc, magnesium and aluminum (abstract). There is no support in the specification for metal in general. In other words, there is no support for platinum, gold or other metals. The claim is significantly broader than the teaching of the specification; therefore fails to comply with the written description requirement.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 16, 17, 19, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al (EP 0999640 A2) in view of Puchinger et al (Gallium nitride thin layers via a liquid precursor route) or Aldinger et al (US 6,254,675).

Nakamura et al discloses a surface acoustic wave device comprising a sapphire single crystal substrate, a buffer layer of GaN formed on the sapphire single crystal substrate and an

aluminum nitride single crystal layer formed on the buffer layer with an average thickness larger than that of the buffer layer (claim 1). Nakamura et al discloses a buffer layer of GaN and an AlN nitride alloy film, this reads on applicant's Group III elements are different. Nakamura et al also teaches the aluminum nitride single crystal layer is deposited by MOCVD ([0030]).

Nakamura et al does not teach spin coating the substrate with a liquid comprising one or more group III elements and nitride on a substrate and annealing the spin-coated layer in a gas atmosphere at a temperature equal to or higher than 700°C so as to crystallize the spin coated layer spreading a liquid comprising group III elements and nitrogen on a substrate and coating the substrate with a thin film comprising group III elements and nitrogen by spinning at selected rotation speeds.

In a method of forming gallium nitride, note entire reference, Puchinger et al teaches a chemical solution deposition method used to grow thin epitaxial GaN film on sapphire substrate. Puchinger et al teaches the film were grown by spin coating a gallium carbodiimide based polymeric precursor, this reads on applicant's liquid comprising group III elements and nitrogen, onto sapphire and pyrolyzing in NH_3 at 900°C (Abstract). Puchinger et al also teaches buffer layers or AlN or GaN were found to improve the crystal quality of deposited GaN films (pg 153-154). Puchinger et al also teaches the GaN films may be used as buffer layers in conventional GaN thin film growth techniques (pg 154). Puchinger et al teaches spinning speeds (table 1) and heat treating until transformation of a precursor material into a poly or single crystal thin film (pg 154), this reads on applicant's annealing so as to crystallize the spin coated layer. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify

Nakamura et al with Puchinger method of making a buffer layer for GaN films using solution deposition because it is simpler than conventional techniques (pg 154).

In a method of producing GaN layers, Aldinger et al teaches a precursor compound is distributed uniformly over a substrate of Si, SiC or Al_2O_3 by spin coating and a pyrolysis treatment of the precursor compound is carried out by heating to a temperature of at least 600°C under a reactive atmosphere containing ammonia to convert the precursor into crystalline GaN (col 2, ln 1-65 and Claim 1). Aldinger et al teaches a precursor compound of $Ga_w(NCN)_x(SiMe_3)_yCl_z$ (col 4, ln 1-10), this reads on applicant's liquid comprising group III elements and nitrogen. The GaN layers can be used as buffer layers for production of thick GaN layers (col 3, ln 30-45). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Nakamura et al with Aldinger et al's method of making a buffer layer for GaN because it is simpler and economically advantageous (col 1, ln 25-40).

3. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al (EP 0999640 A2) in view of Puchinger et al (Gallium nitride thin layers via a liquid precursor route) or Aldinger et al (US 6,254,675) as applied to claims 16, 17, 19, and 24 above, and further in view of Sverdlov et al (US 5,888,886).

The combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al teaches all of the limitations of claim 25, as discussed previously, except the epitaxial III-V nitride alloy film is grown by a sequential combination of two or more different growth methods selected from the group consisting of metal organic chemical vapor deposition, molecular beam epitaxy and hydride vapor phase epitaxy.

In a method of making a III-V semiconductor, Sverdlov et al teaches Group III nitride compound semiconductor materials are promising material for light emitting devices and various techniques are known for growing Group III nitride semiconductors such as metalorganic chemical vapor deposition (MOCVD), molecular beam epitaxy (MBE) and the hydride vapor phase epitaxy method (HVPE) (col 1, ln 1-35), this a teaching of equivalent methods for growing Group III nitrides. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al by growing group III nitride by a sequential combination of two or more different growth methods because MOCVD, MBE and HVPE are taught to equivalent methods of growing group III nitrides by Sverdlov et al and the combination of equivalents for the same purpose is held to be obvious (MPEP 2144.06).

4. Claims 31-32 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al (EP 0999640 A2) in view of Puchinger et al (Gallium nitride thin layers via a liquid precursor route) or Aldinger et al (US 6,254,675) as applied to claims 16, 17, 19, and 24 above, and further in view of Nishio et al (US 5,786,606).

The combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al teaches all of the limitations of claim 31, as discussed previously, except the substrate has a cover layer on the surface on which the spin coating is applied.

Nishio et al discloses a silicon substrate with a silicon-carbide surface layer thereon grown by MOCVD at a temperature of 600°C (col 4, ln 1-67 and Example 1) and AlGaN or GaN buffer layer, thereon by MOCVD and growing an n-type GaN layer on the buffer layer, note

entire reference. Nishio et al also teaches the use of a substrate having a silicon carbide based layer formed on the surface permits performing a crystal growth with a lattice mismatching made markedly smaller, compared with the use of a sapphire substrate (col 4, ln 55 to col 5, ln 10). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al with Nishio et al's silicon substrate covered with silicon carbide because the lattice mismatching is smaller compared to a sapphire substrate.

Referring to claim 52, Nishio et al teaches a SiC layer formed by MOCVD, this reads on applicant's CVD.

5. Claims 31, 33 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al (EP 0999640 A2) in view of Puchinger et al (Gallium nitride thin layers via a liquid precursor route) or Aldinger et al (US 6,254,675) as applied to claims 16, 17, 19, and 24 above, and further in view of Furushima (US 5,815,520).

The combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al teaches all of the limitations of claim 31, as discussed previously, except the substrate has a cover layer on the surface on which the spin coating is applied.

In a method of forming a semiconductor device, Furushima discloses a ZnO, zinc oxide, epitaxial layer on a silicon substrate **9** and forming a III-V, an InGaAlN, buffer layer **10** thereon and forming a III-V n-type cladding layer **4** on the buffer layer, where the layers are formed by MOCVD at a temperature of 1000°C (col 5, ln 30-50). Furushima also teaches it is very difficult to grow a good epitaxial layer on a sapphire substrate and the buffer layer of ZnO is superior in

terms of a buffer layer of GaAlN in the case of epitaxial growth on sapphire or Si substrate (col 2, ln 5 to col 3, ln 45).

Referring to claim 52, Furushima teaches MOCVD, this reads on applicant's CVD (col 4, ln 20-40).

6. Claims 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al (EP 0999640 A2) in view of Puchinger et al (Gallium nitride thin layers via a liquid precursor route) or Aldinger et al (US 6,254,675) as applied to claims 16, 17, 19, and 24 above, and further in view of Furukawa et al (US 6,017,807)

The combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al teaches all of the limitations of claim 23, as discussed previously, except the epitaxial III-V nitride alloy film comprises a pn junction.

Furukawa et al discloses a GaN compound semiconductor made up of a plurality of p-type, n-type or I-type GaN compound semiconductors, which are formed by MOCVD or MBE on a sapphire substrate. Furukawa et al also discloses a PN junction type consisting of a buffer layer which is made of a GaN layer formed on a sapphire substrate and a laminated structure which is made up of an n-type GaN and a p-type GaN layer both being formed on the buffer layer. Furukawa et al also teaches a GaN compound semiconductor represented by the general expression Al(x)In(y)Ga(1-x-y)N ($1 \geq x \geq 0$, $1 \geq y \geq 0$) (col 1, ln 15-35). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al by

doping the group III nitride to form a pn junction, as taught by Furukawa et al, because PN junctions are useful are blue light emitting diodes (col 1, ln 25-30).

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al (EP 0999640 A2) in view of Puchinger et al (Gallium nitride thin layers via a liquid precursor route) or Aldinger et al (US 6,254,675) as applied to claims 16, 17, 19, and 24 above, and further in view of Iacoponi et al (US 6,048,790).

The combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al teaches all of the limitation of claim 20 including a gas atmosphere of ammonia, which is a well known reducing gas (Narumi et al below), as discussed previously, except the gas atmosphere comprises radical nitrogen atoms.

In a deposition of a thin film using a reducing ambient, Iacoponi et al teaches a reducing ambient of hydrogen gas, nitrogen gas or reactive nitrogen such as plasma, i.e. radical nitrogen atoms (col 5, ln 1-65). Iacoponi et al also teaches a reactive nitrogen plasma may be sufficiently reducing without heating of the substrate (col 5, ln 15-30). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nakamura et al and Puchinger et al or the combination of Nakamura et al and Aldinger et al because radical nitrogen is a known equivalent to a reducing gas and substitution of a known equivalent for the same purpose is obvious (MPEP 2144.06) and a reducing ambient can be produced without heating, which reduces operating costs.

8. Claim 34-35, 37-40, 42, 48 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanishi et al (JP 11-243229), where US 6,146,916 is used as an accurate translation, in view of Ito et al (US 5,699,035).

Nanishi et al teaches a method of forming a GaN based semiconductor layer includes the steps of forming a ZnO buffer layer on a glass or silicon substrate and epitaxially growing a GaN based semiconductor layer on the ZnO buffer layer ('916 Abstract). Nanishi et al also teaches the ZnO buffer layer is polycrystalline ('916 col 5, ln 20-25). Nanishi et al also teaches the epitaxial layer is deposited using electron cyclotron resonance-molecular beam epitaxy ('916 claim 1).

Nanishi et al does not discloses spreading a liquid comprising a metal element and oxygen on a substrate and forming a spin coated layer of the liquid on the substrate by spinning at selected rotation speeds and annealing so as to crystallize the spin coated layer.

In a method of forming a ZnO thin film, note entire reference, Ito et al teaches a conventional spin coating, where an eyedropper is used to deposit a precursor solution with excess liquid being removed through the rotation yielding a solid metal oxide layer on to a silicon substrate or sapphire substrate (col 5, ln 1-40 and col 3, ln 40-60). Ito et al also teaches a precursor solution of metal alkoxides i.e. a liquid comprising metal and oxygen (col 4, ln 20-65). Ito et al also teaches annealing a metal oxide residue in an oxygen environment at 400-1000°C (col 5, ln 45-67 and Example 4). Ito et al also teaches ZnO layer with a grain size of less than 300 nm (col 2, ln 1-67). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Nanishi et al vapor phase growth with Ito et al's method of forming a crystalline film using solution because solution routes to single crystal thin films are

economically advantageous, note Aldinger et al (col 1, ln 25-30), Puchinger et al (pg 154) and Lange, below.

Referring to claim 35 and 38, the combination of Nanishi et al and Ito et al teaches annealing a ZnO layer in oxygen prior to forming additional layers.

Referring to claim 37, the combination of Nanishi et al and Ito et al teaches an oxygen environment. The combination of Nanishi et al and Ito et al does not teach a H_2O gas atmosphere. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nanishi et al and Ito et al by using a H_2O atmosphere because H_2O is a known equivalent to oxygen as a oxygen environment and substitution of a known equivalent for the same purpose is obvious (MPEP 2144.06)

Referring to claim 39-40, the combination of Nanishi et al and Ito et al teaches from a zinc oxide layer on a Si substrate. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nanishi et al and Ito et al by using other known substrates, such as sapphire, SiC, GaAs, InP, GaP, ZnO, MgO, $LiGaO_2$, and $LiAlO_2$ because substitution of known equivalent is held to be obvious (MPEP 2144.06).

Referring to claim 42, the combination of Nanishi et al and Ito et al teaches a MBE process.

Referring to claim 48, the combination of Nanishi et al and Ito et al teaches annealing at 400-1000°C. Overlapping ranges are held to be obvious (MPEP 2144.05).

Referring to claim 51, the combination of Nanishi et al and Ito et al teaches annealing in an oxygen environment.

9. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanishi et al (JP 11-243229), where US 6,146,916 is used as an accurate translation, in view of Ito et al (US 5,699,035) as applied to claims 34-35, 37-40, 42, 48 and 51 above, and further in view of Furushima (US 5,815,520) or Kitagawa et al (JP 04-068579), an English Abstract has been provided.

The combination of Nanishi et al and Ito et al teaches all of the limitations of claim 41, as discussed previously, except the epitaxial nitride alloy film comprises a pn junction.

In a method of making a light emitting device, Furushima discloses a ZnO epitaxial layer buffer layer **2** on a sapphire **1** or silicon **9** substrate and a InGaAlN buffer layer **3** and an n-type InGaAlN cladding layer **4** grown on the ZnO layer, where the layers are formed by MOCVD, metal organic chemical vapor deposition, to form a pn junction, note entire reference. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nanishi et al and Ito et al by forming a pn junction, as taught by Furushima to make a useful light emitting diode.

In a method of making a light emitting diode, Kitagawa et al teaches a ZnO layer and an n-type GaN and p-type GaN layer formed, thereon to form a GaN pn junction light emitting element (Abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nanishi et al and Ito et al with Kitagawa et al's pn junction to forming a useful light emitting element.

10. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanishi et al (JP 11-243229), where US 6,146,916 is used as an accurate translation, in view of Ito et al (US

5,699,035) as applied to claims 34-35, 37-40, 42, 48 and 51 above, and further in view of Hofmann et al (US 4,784,975).

The combination of Nanishi et al and Ito et al teaches all of the limitations of claim 37, as discussed previously, except the atmosphere comprises H_2O.

In a method of annealing, note entire reference, Hofmann et al teaches annealing in an ambient that contains an oxygen containing gaseous species, where suitable oxygen containing species include oxygen and H_2O (col 3, ln 50-67). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nanishi et al and Ito et al because H_2O is a known equivalent to oxygen as an oxygen atmosphere and substitution of a known equivalent for the same purpose is obvious (MPEP 2144.06).

11. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanishi et al (JP 11-243229), where US 6,146,916 is used as an accurate translation, in view of Ito et al (US 5,699,035) as applied to claims 34-35, 37-40, 42, 48 and 51 above, and further in view of Sverdlov et al (US 5,888,886).

The combination of Nanishi et al and Ito et al teaches all of the limitations of claim 43, as discusses previously, except the epitaxial III-V nitride alloy film is grown by a sequential combination of two or more different growth methods selected from the group consisting of metal organic chemical vapor deposition, molecular beam epitaxy and hydride vapor phase epitaxy.

In a method of making a III-V semiconductor, Sverdlov et al teaches Group III nitride compound semiconductor materials are promising material for light emitting devices and various

techniques are known for growing Group III nitride semiconductors such as metalorganic chemical vapor deposition (MOCVD), molecular beam epitaxy (MBE) and the hydride vapor phase epitaxy method (HVPE) (col 1, ln 1-35), this a teaching of equivalent methods for growing Group III nitrides. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Nanishi et al and Ito et al by growing group III nitride by a sequential combination of two or more different growth methods because MOCVD, MBE and HVPE are taught to be equivalent methods of growing group III nitrides by Sverdlov et al and the combination of equivalents for the same purpose is held to be obvious (MPEP 2144.06).

Response to Arguments

12. Applicant's arguments with respect to claims 16, 17, 19, 20, 23, 24, 25, 31-35, 37-43, 48, and 51-52 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Enomoto et al (US 5,227,011) teaches forming a ZnO layer by multiple equivalent methods, which include MOCVD, MBE and spin coating (col 9, ln 35-55).

Narumi et al (US 4,990,323) teaches a heat treatment performed in a current of a reducing gas such as, hydrogen, carbon monoxide or ammonia or a mixed gas consisting of a reducing gas and an inert gas such as nitrogen or argon (col 3, ln 1-40).

Keller et al (US 5,891,790) teaches a substrate for the formation of GaN is typically sapphire, but other materials such as silicon carbide, zinc oxide, silicon can be used (col 3, ln 1-10 and claim 7).

Logan et al (US 3,829,556) teaches a sapphire substrate can be used or a substrate such as silicon carbide or other substrate with lattice structures compatible with the growth of gallium nitride can be used (col 4, ln 35-55).

Lange ("Chemical solution routes to single crystal thin films") teaches one advantage solution routes is the economics relative to capital intensive vapor phase routes and a second advantage is the high degree of compositional control inherent with solution synthesis (pg 903).

Ochi et al (US 5,296,169) teaches zinc oxide varistors are polycrystalline ceramics (col 1, ln 10-20).

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew J Song
Examiner
Art Unit 1765

MJS

NADINE G NORTON
SUPERVISORY PATENT EXAMINER